

111TH CONGRESS
2D SESSION

H. R. 5866

To amend the Energy Policy Act of 2005 requiring the Secretary of Energy to carry out initiatives to advance innovation in nuclear energy technologies, to make nuclear energy systems more competitive, to increase efficiency and safety of civilian nuclear power, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

JULY 27, 2010

Mr. GORDON of Tennessee (for himself, Mr. HALL of Texas, Mr. BAIRD, and Mr. INGLIS) introduced the following bill; which was referred to the Committee on Science and Technology

A BILL

To amend the Energy Policy Act of 2005 requiring the Secretary of Energy to carry out initiatives to advance innovation in nuclear energy technologies, to make nuclear energy systems more competitive, to increase efficiency and safety of civilian nuclear power, and for other purposes.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*

3 **SECTION 1. SHORT TITLE.**

4 This Act may be cited as the “Nuclear Energy Re-
5 search and Development Act of 2010”.

1 **SEC. 2. OBJECTIVES.**

2 Section 951(a) of the Energy Policy Act of 2005 (42
3 U.S.C. 16271(a)) is amended—

4 (1) by redesignating paragraphs (2) through
5 (7) as paragraphs (5) through (10), respectively;
6 and

7 (2) by inserting after paragraph (1) the fol-
8 lowing new paragraphs:

9 “(2) Reducing the costs of nuclear reactor sys-
10 tems.

11 “(3) Reducing used nuclear fuel and nuclear
12 waste products generated by civilian nuclear energy.

13 “(4) Supporting technological advances in areas
14 that industry by itself is not likely to undertake be-
15 cause of technical and financial uncertainty.”.

16 **SEC. 3. FUNDING.**

17 Section 951 of the Energy Policy Act of 2005 (42
18 U.S.C. 16271) is further amended—

19 (1) in subsection (b), by striking paragraphs
20 (1) through (3) and inserting the following:

21 “(1) \$419,000,000 for fiscal year 2011;

22 “(2) \$429,000,000 for fiscal year 2012; and

23 “(3) \$439,000,000 for fiscal year 2013.”; and

24 (2) in subsection (d)—

25 (A) by striking “under subsection (a)” and
26 inserting “under subsection (b)”;

1 (B) by amending paragraph (1) to read as
2 follows:

3 “(1) For activities under section 953—

4 “(A) \$201,000,000 for fiscal year 2011;

5 “(B) \$201,000,000 for fiscal year 2012;

6 and

7 “(C) \$201,000,000 for fiscal year 2013.”;

8 and

9 (C) by inserting after paragraph (3) the
10 following new paragraphs:

11 “(4) For activities under section 952, other
12 than those described in section 952(d)—

13 “(A) \$64,000,000 for fiscal year 2011;

14 “(B) \$64,000,000 for fiscal year 2012; and

15 “(C) \$64,000,000 for fiscal year 2013.

16 “(5) For activities under section 952(d)—

17 “(A) \$55,000,000 for fiscal year 2011;

18 “(B) \$65,000,000 for fiscal year 2012; and

19 “(C) \$75,000,000 for fiscal year 2013.

20 “(6) For activities under section 958—

21 “(A) \$99,000,000 for fiscal year 2011;

22 “(B) \$99,000,000 for fiscal year 2012; and

23 “(C) \$99,000,000 for fiscal year 2013.”.

1 **SEC. 4. NUCLEAR ENERGY RESEARCH AND DEVELOPMENT**
2 **PROGRAMS.**

3 Section 952 of the Energy Policy Act of 2005 (42
4 U.S.C. 16272) is amended by striking subsections (c)
5 through (e) and inserting the following:

6 “(c) REACTOR CONCEPTS.—

7 “(1) IN GENERAL.—The Secretary shall carry
8 out a program of research, development, demonstra-
9 tion, and commercial application to advance fission
10 power systems as well as technologies to sustain cur-
11 rently deployed systems.

12 “(2) DESIGNS AND TECHNOLOGIES.—In con-
13 ducting the program under this subsection, the Sec-
14 retary shall examine advanced reactor designs and
15 nuclear technologies, including those that—

16 “(A) are economically competitive with
17 other electric power generation plants;

18 “(B) have higher efficiency, lower cost, and
19 improved safety compared to reactors in oper-
20 ation as of the date of enactment of the Nu-
21 clear Energy Research and Development Act of
22 2010;

23 “(C) utilize passive safety features;

24 “(D) minimize proliferation risks;

25 “(E) substantially reduce production of
26 high-level waste per unit of output;

1 “(F) increase the life and sustainability of
2 reactor systems currently deployed;

3 “(G) use improved instrumentation; or

4 “(H) are capable of producing large-scale
5 quantities of hydrogen or process heat.

6 “(3) INTERNATIONAL COOPERATION.—In car-
7 rying out the program under this subsection, the
8 Secretary shall seek opportunities to enhance the
9 progress of the program through international co-
10 operation through such organizations as the Genera-
11 tion IV International Forum, or any other inter-
12 national collaboration the Secretary considers appro-
13 priate.

14 “(4) EXCEPTIONS.—No funds authorized to be
15 appropriated to carry out the activities described in
16 this subsection shall be used to fund the activities
17 authorized under sections 641 through 645.”.

18 **SEC. 5. SMALL MODULAR REACTOR PROGRAM.**

19 Section 952 of the Energy Policy Act of 2005 (42
20 U.S.C. 16272) is further amended by adding at the end
21 the following new subsection:

22 “(d) SMALL MODULAR REACTOR PROGRAM.—

23 “(1) IN GENERAL.—The Secretary shall carry
24 out a small modular reactor program to promote the
25 research, development, demonstration, and commer-

1 cial application of small modular reactors, including
2 through cost-shared projects for commercial applica-
3 tion of reactor system designs. Activities may also
4 include development of advanced computer modeling
5 and simulation tools, by Federal or non-Federal en-
6 tities, that demonstrate and validate new design ca-
7 pabilities of innovative small modular reactor de-
8 signs.

9 “(2) DEFINITION.—For the purposes of this
10 subsection, the term ‘small modular reactor’ means
11 a nuclear reactor—

12 “(A) with a rated capacity of less than 300
13 electrical megawatts; and

14 “(B) that can be constructed and operated
15 in combination with similar reactors at a single
16 site.

17 “(3) LIMITATION.—Demonstration activities
18 carried out under this section shall be limited to in-
19 dividual technologies and systems, and shall not in-
20 clude demonstration of full reactor systems or full
21 plant operations.

22 “(4) ADMINISTRATION.—In conducting the
23 small modular reactor program, the Secretary may
24 enter into cooperative agreements to support small
25 modular reactor designs that enable—

1 “(A) lower capital costs or increased access
2 to private financing in comparison to current
3 large reactor designs;

4 “(B) reduced long-term radiotoxicity,
5 mass, or decay heat of the nuclear waste pro-
6 duced by generation;

7 “(C) increased operating safety of nuclear
8 facilities;

9 “(D) reduced dependence of reactor sys-
10 tems on water resources;

11 “(E) increased seismic resistance of nu-
12 clear generation;

13 “(F) reduced proliferation risks through
14 integrated safeguards and security proliferation
15 controls; and

16 “(G) increased efficiency in reactor manu-
17 facturing and construction.

18 “(5) APPLICATION.—To be eligible to enter into
19 a cooperative agreement with the Secretary under
20 this subsection, an applicant shall submit to the Sec-
21 retary a proposal for the small modular reactor
22 project to be undertaken. The proposal shall docu-
23 ment—

24 “(A) all partners and suppliers that will be
25 active in the small modular reactor project, in-

1 including a description of each partner or sup-
2 plier's anticipated domestic and international
3 activities;

4 “(B) measures to be undertaken to enable
5 cost-effective implementation of the small mod-
6 ular reactor project;

7 “(C) an accounting structure approved by
8 the Secretary; and

9 “(D) all known assets that shall be con-
10 tributed to satisfy the non-Federal share re-
11 quirement under paragraph (6).

12 “(6) NON-FEDERAL SHARE.—Notwithstanding
13 section 988, the Secretary shall require the parties
14 to a cooperative agreement under this subsection to
15 be responsible for not less than 50 percent of the
16 costs of the small modular reactor project.

17 “(7) CALCULATION OF NON-FEDERAL SHARE
18 AMOUNT.—Section 988(d) of the Energy Policy Act
19 of 2005 (42 U.S.C. 16352(d)) shall apply in deter-
20 mining the non-Federal share in conjunction with an
21 award of financial assistance under this section.

22 “(8) PROJECT SELECTION CRITERIA.—The Sec-
23 retary shall consider the following factors in entering
24 into a cooperative agreement under this subsection:

1 “(A) The domestic manufacturing capabili-
 2 ties of the parties to the cooperative agreement
 3 and their partners and suppliers.

4 “(B) The viability of the reactor design
 5 and the business plan or plans of the parties to
 6 the cooperative agreement.

7 “(C) The parties to the cooperative agree-
 8 ment’s potential to continue the development of
 9 small modular reactors without Federal sub-
 10 sidies or loan guarantees.

11 “(D) The non-Federal share to be pro-
 12 vided.”.

13 **SEC. 6. FUEL CYCLE RESEARCH AND DEVELOPMENT.**

14 (a) AMENDMENTS.—Section 953 of the Energy Pol-
 15 icy Act of 2005 (42 U.S.C. 16273) is amended—

16 (1) in the section heading by striking “**AD-**
 17 **VANCED FUEL CYCLE INITIATIVE**” and inserting
 18 “**FUEL CYCLE RESEARCH AND DEVELOPMENT**”;

19 (2) by striking subsection (a);

20 (3) by redesignating subsections (b) through (d)
 21 as subsections (d) through (f), respectively; and

22 (4) by inserting before subsection (d), as so re-
 23 designated by paragraph (3) of this subsection, the
 24 following new subsections:

1 “(a) IN GENERAL.—The Secretary shall conduct a
2 fuel cycle research and development program (referred to
3 in this section as the ‘program’) on fuel cycle options that
4 improve uranium resource utilization, maximize energy
5 generation, minimize nuclear waste creation, improve safe-
6 ty, and mitigate risk of proliferation in support of a na-
7 tional strategy for spent nuclear fuel and the reactor con-
8 cepts research, development, demonstration, and commer-
9 cial application program under section 952(c).

10 “(b) FUEL CYCLE OPTIONS.—Under this section the
11 Secretary may consider implementing the following initia-
12 tives:

13 “(1) OPEN CYCLE.—Developing fuels, including
14 the use of nonuranium materials, for use in reactors
15 that increase energy generation and minimize the
16 amount of nuclear waste produced in an open fuel
17 cycle.

18 “(2) MODIFIED OPEN CYCLE.—Developing fuel
19 forms, reactors, and limited separation and trans-
20 mutation methods that increase fuel utilization and
21 reduce nuclear waste in a modified open fuel cycle.

22 “(3) FULL RECYCLE.—Developing technologies
23 to repeatedly recycle nuclear waste products to mini-
24 mize radiotoxicity, mass, and decay heat to the
25 greatest extent possible.

1 “(4) ADVANCED STORAGE METHODS.—Devel-
2 oping advanced storage technologies for both onsite
3 and long-term storage that substantially prolong the
4 effective life of current storage devices or that sub-
5 stantially improve upon existing nuclear waste stor-
6 age technologies and methods, including repositories.

7 “(5) ALTERNATIVE AND DEEP BOREHOLE
8 STORAGE METHODS.—Developing alternative storage
9 methods for long-term storage, including deep
10 boreholes into stable crystalline rock formations and
11 salt dome storage.

12 “(6) OTHER TECHNOLOGIES.—Developing any
13 other technology or initiative that the Secretary de-
14 termines is likely to advance the objectives of the
15 program established under subsection (a).

16 “(c) BLUE RIBBON COMMISSION REPORT.—In car-
17 rying out this section the Secretary shall give consider-
18 ation to the final report on a long-term nuclear waste solu-
19 tion produced by the Blue Ribbon Commission on Amer-
20 ica’s Nuclear Future. Not later than 180 days after the
21 release of the Blue Ribbon Commission on America’s Nu-
22 clear Future final report, the Secretary shall transmit to
23 Congress a report describing any plans the Department
24 may have to incorporate any relevant recommendations
25 from this report into the program.”.

1 (b) CONFORMING AMENDMENT.—The item relating
 2 to section 953 in the table of contents of the Energy Policy
 3 Act of 2005 is amended to read as follows:

“Sec. 953. Fuel cycle research and development.”.

4 **SEC. 7. NUCLEAR ENERGY ENABLING TECHNOLOGIES PRO-**
 5 **GRAM.**

6 (a) AMENDMENT.—Subtitle E of title IX of the En-
 7 ergy Policy Act of 2005 (42 U.S.C. 16271 et seq.) is
 8 amended by adding at the following new section:

9 **“SEC. 958. NUCLEAR ENERGY ENABLING TECHNOLOGIES.**

10 “(a) IN GENERAL.—The Secretary shall conduct a
 11 program to support the integration of activities under-
 12 taken through the reactor concepts research, development,
 13 demonstration, and commercial application program under
 14 section 952(c) and the fuel cycle research and development
 15 program under section 953, and support crosscutting nu-
 16 clear energy concepts. Activities commenced under this
 17 section shall be concentrated on broadly applicable re-
 18 search and development focus areas.

19 “(b) ACTIVITIES.—Activities conducted under this
 20 section may include research involving—

21 “(1) advanced reactor materials;

22 “(2) advanced catastrophic radiation mitigation
 23 methods;

24 “(3) advanced proliferation and security risk
 25 assessment methods;

1 “(4) advanced sensors and instrumentation;

2 “(5) advanced nuclear manufacturing methods;

3 or

4 “(6) any crosscutting technology or trans-
5 formative concept aimed at establishing substantial
6 and revolutionary enhancements in the performance
7 of future nuclear energy systems that the Secretary
8 considers relevant and appropriate to the purpose of
9 this section.

10 “(c) REPORT.—The Secretary shall submit, as part
11 of the annual budget submission of the Department, a re-
12 port on the activities of the program conducted under this
13 section, which shall include a brief evaluation of each ac-
14 tivity’s progress.”.

15 (b) CONFORMING AMENDMENT.—The table of con-
16 tents of the Energy Policy Act of 2005 is amended by
17 adding at the end of the items for subtitle E of title IX
18 the following new item:

“Sec. 958. Nuclear energy enabling technologies.”.

19 **SEC. 8. EMERGENCY RISK ASSESSMENT AND PREPARED-**
20 **NESS REPORT.**

21 Not later than 180 days after the date of enactment
22 of this Act, the Secretary shall transmit to the Congress
23 a report summarizing quantitative risks associated with
24 the potential of a severe accident arising from the use of
25 nuclear power, and outlining the technologies currently

1 available to mitigate the consequences of such an accident.
2 The report shall include recommendations of areas of tech-
3 nological development that should be pursued to reduce
4 the public harm arising from such an incident.

5 **SEC. 9. NEXT GENERATION NUCLEAR PLANT.**

6 (a) PROTOTYPE PLANT LOCATION.—Section
7 642(b)(3) of the Energy Policy Act of 2005 (42 U.S.C.
8 16022(b)(3)) is amended to read as follows:

9 “(3) PROTOTYPE PLANT LOCATION.—The pro-
10 totype nuclear reactor and associated plant shall be
11 constructed at a location determined by the consor-
12 tium through an open and transparent competitive
13 selection process.”.

14 (b) REPORT.—

15 (1) REQUIREMENT.—Not later than 1 year
16 after the date of enactment of this Act, the Comp-
17 troller General shall transmit to the Congress a re-
18 port providing a status update of the Next Genera-
19 tion Nuclear Plant program that provides analysis
20 of—

21 (A) its progress;

22 (B) how Federal funds appropriated for
23 the project have been distributed and spent;
24 and

1 (C) the current and expected participation
2 by non-Federal entities.

3 (2) CONTENTS.—The report shall include—

4 (A) an analysis of the proposed facility's
5 technical capabilities and remaining techno-
6 logical development challenges, and a cost esti-
7 mate and construction schedule;

8 (B) an assessment of the advantages and
9 disadvantages of funding a pilot-scale research
10 reactor project in lieu of a full-scale commercial
11 power reactor;

12 (C) an assessment of alternative construc-
13 tion sites proposed by private industry;

14 (D) an assessment of the extent to which
15 the Department of Energy is working with in-
16 dustry and the Nuclear Regulatory Commission
17 to ensure that the Next Generation Nuclear
18 Plant program meets industry expectations for
19 long-term application of technologies and ad-
20 dresses potential licensing procedures for de-
21 ployment;

22 (E) an assessment of the known or antici-
23 pated challenges to securing private non-Fed-
24 eral cost share funds and any measures to over-
25 come these challenges, including any alternative

1 funding approaches such as front loading the
2 Federal share;

3 (F) an assessment of project risks, includ-
4 ing those related to—

5 (i) project scope, schedule, and re-
6 sources;

7 (ii) the formation of partnerships or
8 agreements between the Department and
9 the private sector necessary for the
10 project's success; and

11 (iii) the Department's capabilities to
12 identify and manage such risks; and

13 (G) an assessment of what is known about
14 the potential impact of natural gas and other
15 fossil fuel prices on private entity participation
16 in the project.

17 **SEC. 10. TECHNICAL STANDARDS COLLABORATION.**

18 (a) IN GENERAL.—The Director of the National In-
19 stitute of Standards and Technology shall establish a nu-
20 clear energy standards committee (in this section referred
21 to as the “technical standards committee”) to facilitate
22 and support, consistent with the National Technology
23 Transfer and Advancement Act of 1995, the development
24 or revision of technical standards for new and existing nu-
25 clear power plants and advanced nuclear technologies.

1 (b) MEMBERSHIP.—

2 (1) IN GENERAL.—The technical standards
3 committee shall include representatives from appro-
4 priate Federal agencies and the private sector, and
5 be open to materially affected organizations involved
6 in the development or application of nuclear energy-
7 related standards.

8 (2) CO-CHAIRS.—The technical standards com-
9 mittee shall be co-chaired by a representative from
10 the National Institute of Standards and Technology
11 and a representative from a private sector standards
12 organization.

13 (c) DUTIES.—The technical standards committee
14 shall, in cooperation with appropriate Federal agencies—

15 (1) perform a needs assessment to identify and
16 evaluate the technical standards that are needed to
17 support nuclear energy, including those needed to
18 support new and existing nuclear power plants and
19 advanced nuclear technologies;

20 (2) formulate, coordinate, and recommend pri-
21 orities for the development of new technical stand-
22 ards and the revision of existing technical standards
23 to address the needs identified under paragraph (1);

24 (3) facilitate and support collaboration and co-
25 operation among standards developers to address the

1 needs and priorities identified under paragraphs (1)
2 and (2);

3 (4) as appropriate, coordinate with other na-
4 tional, regional, or international efforts on nuclear
5 energy-related technical standards in order to avoid
6 conflict and duplication and to ensure global com-
7 patibility; and

8 (5) promote the establishment and maintenance
9 of a database of nuclear energy-related technical
10 standards.

11 (d) AUTHORIZATION OF APPROPRIATIONS.—There
12 are authorized to be appropriated \$1,000,000 for each of
13 fiscal years 2011 through 2013 to the Director of the Na-
14 tional Institute for Standards and Technology for activi-
15 ties under this section.

○